European Patent Office

SUPPLEMENTARY EUROPEAN SEARCH REPORT

Application Number
EP 99 90 6974

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
E	WO 98 17587 A (LEITER KLAUS ;MAITRON GMBH (AT); NEIDHARDT KLAUS (AT); WALDER GERH) 30 April 1998 (1998-04-30) * page 7, line 9 - page 12, line 25 * * figures 2,4 * ---	1-3,6-9, 12-19, 21,23	C02F1/461 C02F1/467 C02F1/46 C02F1/76
A	US 4 569 729 A (GOTO NOBUTAKA ET AL) 11 February 1986 (1986-02-11) * column 5, line 59 - column 7, line 10 * * figures 1-3 * -----	1-23	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

C02F

The supplementary search report has been based on the last set of claims valid and available at the start of the search.

Place of search	Date of completion of the search	Examiner
MUNICH	21 February 2001	Miebach, V

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C04)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 99 90 6974

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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21-02-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9817587 A	30-04-1998	EP 0951448 A	27-10-1999
US 4569729 A	11-02-1986	JP 1723940 C	24-12-1992
		JP 4013432 B	09-03-1992
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		CA 1269635 A	29-05-1990
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		EP 0171478 A	19-02-1986
		KR 8902751 B	26-07-1989
		US 4626331 A	02-12-1986

AMENDED CLAIMS
[received by the International Bureau on 17 June 1999 (17.06.99);
original claims 1, 7 and 18-20 amended;
remaining claims unchanged (3 pages)]

What is claimed is:

1. (Amended) An electrolytic cell for the treatment of water, comprising:

a closed electrolytic chamber having a lower inlet opening and an upper outlet opening for directing water to be treated through said chamber;

a cathode disposed in said chamber for contact with said water;

an anode compartment disposed within said chamber, said compartment formed at least in part by a plurality of porous membranes sequentially disposed so that all of the water entering said compartment must pass sequentially through each said membrane before entering into said compartment, said plurality of membranes sequentially disposed to reduce the rate of back diffusion from said compartment to said chamber of an anion found in said water so that said anion is concentrated within said compartment to a level sufficient to permit a purifying concentration of an oxidizing agent for purifying said water to be produced; and

an anode disposed within said compartment for generating said oxidizing agent from said anion.

2. The electrolytic cell of Claim 1 comprising 2-6 sequentially disposed porous membranes through which said water must pass.

3. The electrolytic cell of Claim 1 wherein said porous membranes are selected from the group consisting of porous porcelain and microporous plastics.

4. The electrolytic cell of Claim 3 wherein said microporous plastics include porous polypropylene felt and microporous polytetrafluoroethylene film.

5. The electrolytic cell of Claim 1 wherein said porous membranes comprise a microporous polytetrafluoroethylene film together with a polypropylene felt having a thickness of about 0.1-0.5 inch.

6. The electrolytic cell of Claim 1 further comprising an aperture in the top of said compartment to permit the escape of gases formed at said anode.

7. (Amended) An electrolytic cell for the treatment of water, comprising:

a closed electrolytic chamber having a lower inlet opening and an upper outlet opening for directing water to be treated through said chamber;

an anode and a cathode disposed within said chamber for contact with said water; and

a plurality of porous membranes sequentially disposed and forming an anode compartment about said anode so that all of the water contacting said anode must pass sequentially through each said membrane, said plurality of membranes sequentially disposed to reduce the rate of back diffusion and increase the concentration of an anion found in said water to a level within said anode compartment sufficient to produce at said anode a purifying concentration of an oxidizing agent for purifying said water.

8. The electrolytic cell of Claim 7 comprising 2-6 sequentially disposed porous membranes through which said water must pass.

9. The electrolytic cell of Claim 7 wherein said porous membranes are selected from the group consisting of porous porcelain and microporous plastics.

17. The electrolytic cell of Claim 7 further comprising a direct current source connected across said anode and said cathode.

18. (Amended) A method for treating water, comprising:

directing water into an electrolytic chamber having a cathode and an anode;

directing a portion of said water sequentially through each of a plurality of porous membranes forming at least part of an anode compartment surrounding said anode so that all water contacting said anode has passed sequentially through said plurality of membranes;

concentrating within said compartment to a level sufficient to permit a purifying concentration of an oxidizing agent to be produced at least one anion found in said water by reducing the rate of back diffusion of said anion from said compartment to said chamber; and

applying a direct current across said anode and said cathode to generate at said anode from said anion a gas comprising an oxidizing agent in a concentration sufficient for purifying said water.

19. (Amended) The method of Claim 18 wherein said anion is chloride and said gas is chlorine.

20. (Amended) The method of Claim 19 further comprising increasing the concentration of chloride in the water contacting said anode in said compartment to at least 2,000 ppm by driving chloride ions sequentially through each of said porous membranes by application of said current across said anode and cathode.

21. The method of Claim 18 wherein said porous membrane is selected from the group consisting of porous porcelain and microporous plastics.